



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,375	01/29/2002	Karl J. Gross	SD-8355	4541

7590

06/18/2003

Timothy Evans
Sandia National Laboratories
MS 9031
7011 East Avenue
Livermore, CA 94550

EXAMINER

MEDINA SANABRIA, MARIBEL

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/066,375

Applicant(s)

GROSS ET AL.

Examiner

Maribel Medina

Art Unit

1754

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 1, 7, and 25 are objected to because of the following informalities:
 - a. In claim 1, 3rd line, after “mixing”, “a” should be changed to --an--, and after “hydride”, --powder-- should be inserted.
 - b. In claim 1, 7th line, after “one”, “of” should be changed to --or--.
 - c. In claim 7, 2nd line, after “alkali”, --metal-- should be inserted.
 - d. In claims 25, 6th line, after “to”, --a-- should be inserted.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-6, 8, 10-17, 19, and 21-26 are rejected under 35 U.S.C. 102(a) as being anticipated by WO 01/68515 (Bogdanovic et al). The US Patent Application Publication for Bogdanovic et al is US 2003/0053948 A1. Reference is made to the US Application Publication in the following rejection.

In regards to claims 1 and 12, Bogdanovic et al disclose a method for producing hydride compounds capable of reversible hydrogenation, comprising: mechanically mixing an aluminum powder, with a finely powdered alkali metal hydride or alkali metal and a titanium-containing catalyst; and hydrogenating the powdery mixture at an elevated pressure and temperature to

Art Unit: 1754

provide and alkali metal aluminum hydride compound (See [0007] and [0012] of US Application Publication).

In regards to claims 2 and 13, Bogdanovic et al disclose that the alkali metal or alkali metal hydride may be any of Na, K, Li, NaOH, KH, or LiH (See [0014] of US Application Publication).

In regards to claims 3 and 14, Bogdanovic et al disclose that the titanium catalyst may be in halides form and exemplifies his invention with the use of TiCl_3 (See [0014] and [0030]).

In regards to claims 4 and 15, Bogdanovic et al disclose an aluminum powder to alkali metal hydride powder between 1:0.3 to 1:5 (see claim 5 of US Application Publication).

In regards to claims 5 and 16, Bogdanovic et al disclose transition metal catalyst (i.e. titanium) in amounts of from 0.1 to 10 mole percent, based on aluminum (see claim 16 of US Application Publication).

In regards to claims 6 and 17, Bogdanovic et al disclose mechanically mixing, stirring or milling the powders (See [0012] and claim 17 of US Application Publication).

In regards to claims 8 and 19, Bogdanovic et al disclose stirring the powders under a protective gas of argon (See [0012] of US Application Publication).

In regards to claims 10, 11, 21 and 22, Bogdanovic et al disclose causing the hydrogenation at temperatures in the range from 20 to 200°C and at pressures in the range between 5 and 150 bar (1 bar = 1 atm) and the hydrogenation lasting from 3.8 to 24 hours (See Table 1, [0012] and claim 18 of US Application Publication).

Art Unit: 1754

In regards to claims 23 and 24, Bogdanovic et al disclose one or more complex alkali metal aluminum hydrides that exhibit reversible hydrogenated and dehydrogenated states and wherein said hydrides comprises NaAlH_4 and Na_3AlH_6 (See claims 1, 5 and 7).

In regards to claims 25-26, Bogdanovic et al disclose dehydrogenation by heating the alkali metal aluminum hydride thereby producing a supply of hydrogen gas and a dehydrogenated form of the alkali metal aluminum hydride and hydrogenating or regenerating the alkali metal aluminum hydride by exposing the dehydrogenated hydride to a source of hydrogen gas (See [0012] of US Application publication).

No difference is seen between the instantly claimed invention and Bogdanovic et al.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7, 9, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogdanovic et al as applied to claims 1-6, 8, 10-17, 19 and 21-26 above, and further in view of WO 99/19250 (Zaluska et al)

Bogdanovic et al applies herein as above.

In regards to claims 9 and 20, Bogdanovic et al fail to disclose the temperature at which the stirring (or mechanical mixing) is carried out.

Art Unit: 1754

Zaluska et al disclose a method of producing complex alkali metal hydrides, wherein two different hydride powders are ball milled at normal pressure and at room temperature (See page 5, lines 3-16).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have carried out Bogdanovic et al mechanical mixing without the use of a solvent of the powders at room temperature, since Zaluska et al disclose the mechanical treatment of reactant powders, in order to obtain a complex hydride compound without the use of a solvent, can be performed at room temperatures.

In regards to claims 7 and 18, Bogdanovic et al fail to disclose carrying ball milling the powders at a weight ratio of mill balls to powders of 30:1 to 12:1 for a time of 0.1 to 10 hours.

Zaluska et al disclose a method of producing complex alkali metal hydrides, wherein two different hydride powders are ball milled at a weigh ratio of mill balls to hydrides of 30: 1 to 2:1 and milling time of 0.25 to 20 hours (See page 6, lines 29-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have milled Bogdanovic et al powders in a ball milling process at the instantly claimed conditions, since Bogdanovic et al disclose the use of any milling process (See claim 17 of US Application Publication) and since Zaluska et al disclose that it is well known in the art to use ball milling at the instantly claimed conditions in methods of producing complex alkali metal-aluminum hydrides.

Alternatively, Zaluska et al disclose that a wide range of grinding, agitation or ball milling conditions can be employed to effect the desired mechanical alloying (mixing) (see page

Art Unit: 1754

6, line 29 to page 7, line 2), this clearly indicates that the conditions for ball milling are a result effective variable.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the instantly claimed conditions for ball milling the powders, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

6. Claims 23-26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Patent No. 6,106,801 (Bogdanovic et al).

In regards to claims 23 and 24, Bogdanovic et al disclose one or more complex alkali metal aluminum hydrides that exhibit reversible hydrogenated and dehydrogenated states and wherein said hydrides comprises NaAlH_4 and Na_3AlH_6 (See col. 2, lines 9-26).

In regards to claims 25-26, Bogdanovic et al disclose dehydrogenation by heating the alkali metal aluminum hydride thereby producing a supply of hydrogen gas and a dehydrogenated form of the alkali metal aluminum hydride and hydrogenating or regenerating the alkali metal aluminum hydride by exposing the dehydrogenated hydride to a source of hydrogen gas (See col.8, lines 9-26).

In the event any differences can be shown for the product of the product by process claims 23, 24 and 25 as opposed to the product taught by Bogdanovic et al, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

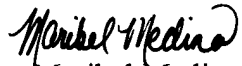
Art Unit: 1754

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maribel Medina whose telephone number is (703) 305-1928. The examiner can normally be reached on Monday through Friday from 7:30 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (703) 308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Maribel Medina
Examiner
Art Unit 1754

mm
June 10, 2003